European Journal of Molecular & Clinical Medicine
ISSN 2515-8260 Volume 09, Issue 03 , 2022

# To Determine The MRI Brain Lesion In Eclampsia Patient

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## ABSTRACT

**Aim:** The aim of this study to determine the MRI Brain lesion in eclampsia patient

**Methods:** After ethical approval, the prospective study was done in the Department of Obstetrics and Gynecology. 60 women with eclampsia were separated into two Category: A (patients with abnormal MRI) and B (patients with normal MRI). A thorough history was taken, and all patients underwent testing such as haemoglobin, 24 hour urine protein, and renal function tests, liver function tests, absolute platelet count, and fundoscopy.

**Results:** MR Imaging was performed on 60 eclamptic women over the course of a year. MRI results were seen in 33.333 percent (n = 20) of the patients. As a result, the study was separated into two category A ( the study group), which included patients who had MRI results, and the category B, which included patients who did not have MRI findings. The study population's average age was 23.02±3.25 years. On MRI, the most prevalent diagnosis was CVT without 'infarct (20%), followed by infarct (6.67%), PRES (5%), and HLE (1.67%). A total of 20 individuals reported neurological Problems of eclampsia, with 18 having positive MRI results and two having negative MRI findings. There were 40 patients with no neurologic manifestation, 2 with positive MRI detection and 38 with negative MRI detection. The sensitivity, specificity, PPV, and NPV of neurological symptoms for abnormal MRI in eclampsia patients were shown to be 92.11 percent, 75.55 percent, 53.87 percent, and 97.16 percent, respectively.

**Conclusion:** We concluded that clinical, laboratory and others parameters were not remarkable associated with positive MRI detection in women with eclampsia. In the follow-up of pregnant

patients with pre-eclampsia/eclampsia, symptoms such as unconsciousness, altered sensorium, headache, blurred vision, seizures, GCS 3, elevated uric acid, and serum creatinine levels should serve as a warning for possible brain lesions, whereas booking status, mean blood pressure, fundoscopy findings, platelet count, haemoglobin, and liver enzymes were not significantly associated with positive magnetic resonance imaging findings in patients with eclampsia.

**Keywords:** MRI, eclampsia

## Introduction

Eclampsia is the most severe stage of the preeclampsia–eclampsia spectrum, with a 3/1000 to 9/1000 incidence in pregnant or recently delivered women. [1] Despite major advances in medical care and the popularity of prenatal diagnosis in recent years, the global incidence and mortality of eclampsia remain high, endangering both mother and foetal life. As a result, early detection of eclampsia has traditionally been one of the most difficult issues in obstetrics. [2]

Eclampsia is a preeclampsia-related acute neurological complication defined by seizures and/or consciousness issues that are not caused by another neurological condition. [3,4] While eclampsia worsens in 1–2 percent of preeclampsia patients in wealthy nations,[3] it is a major public health concern in underdeveloped countries where eclampsia is an obstetric emergency requiring required urgent care. If a result, its administration necessitates a associative approach[5], integrating, as needed, obstetricians, paediatricians, anesthesiologists, critical care and emergency agents. [6]

Cranial conventional magnetic resonance imaging (MRI) is the optimum imaging modality for PRES patients with preeclampsia-eclampsia. [7] Gao et al. employed standard MRI sequences to assess the amount of cerebral edoema in PRES patients and discovered that the score was substantially linked with blood lactate dehydrogenase levels. [8] Another popular MRI sequence is diffusion-weighted imaging (DWI), which is particularly sensitive for discriminating between cytotoxic and vasogenic edema. [9] Recent MRI investigations have demonstrated that DWI can affect pathophysiological alterations in PRES patients during the ictal or periictal phase of epilepsy.

The neuroimaging signs of eclampsia and preeclampsia frequently overlap, primarily manifesting as posterior reversible encephalopathy syndrome (PRES). [10] PRES is a specific clinicoradiologic illness marked by headaches, visual abnormalities, and seizures, as well as primarily parieto-occipital vasogenic edoema and, on rare occasions, cytotoxic edoema. [10] The precise pathophysiological mechanism of preeclampsia-eclampsia with PRES has not been clarified and remains contentious. There is little known regarding whether there are differences in the level and character of cerebral edoema between eclampsia and preeclampsia patients with PRES; also, a "threshold" trigger in the onset of eclampsia has yet to be confirmed. [11-14]

**Material and methods :**

After ethical approval, the prospective study was carried out in the Department of Obstetrics and Gynecology. 60 women with eclampsia were separated into two catogery. Category: A (patients with abnormal MRI) and Category B (healthy patients). Women with hypertension, cramp and seizures owing to metabolic abnormalities were excluded from the research. A thorough history was taken, and all patients underwent testing such as haemoglobin, 24 hour urine protein, and renal or liver function tests, platelet count, and fundoscopy.

**Statistical evaluation :**

Continuous data was reported as mean± SD and categorical data as rates, ratios, and proportions. A probability value (p value) less than 0.5 was deemed statistically significant.

**Results**

MR Imaging was performed on 60 eclamptic women over the course of a year. MRI results were seen in 33.333 percent (n = 20) of the patients. As a result, the study was separated into two category: Category A, which included patients who had MRI results, and category B, which included patients who did not have MRI findings. The study population's average age was 23.02±3.25 years. (Table 1).

**Table 1. Basic profile of the patients :**

| **Age in years** | Category A | Category B |
|---|---|---|
| Below 20 | 6(30%) | 15(37.5%) |
| 20-25 | 11(55%) | 24(60%) |
| Above 25 | 3(15%) | 1(2.5%) |
| Mean age | 23.02 ± 325 | 22.66 ± 2.69 |
| **Presentation** | | |
| Antepartum | 8(40%) | 15(37.5%) |
| Postpartum | 12(60%) | 25(62.5%) |

Sixty percent were primiparous, and forty percent were multiparous. The mean gestational age in women with antepartum eclampsia was 36.02± 4.23 weeks, whereas the mean day of presentation in women with postpartum eclampsia was 4.06± 2.11 days. In all, 61.67 percent of the women experienced postpartum eclampsia, whereas 38.33 had antepartum eclampsia. Fits, headache, impaired vision, unconsciousness, and altered sensorium were considerably greater in the study group, although mean blood pressure did not vary significantly between the two groups. More than half of the patients had more than one clinical manifestation.

The mean uric acid levels in the study group were 0.42± 0.09 mmol/ L, whereas in the control group they were 0.25± 0.11 mmol/ L, which was determined to be statistically significant (p value 0.004). Mean blood creatinine levels were determined to be 81± 21 mol/ L in the study group and 70± 11 mol/ L in the control group (p value 0.03).

**Table 2 clinical and laboratory parameter**

| Clinical parameter | Category A | Category B | P-value |
|---|---|---|---|
| Mean SBP (mm of Hg) | 154.88± 11.85 | 146.55 ± 11.29 | 0.33 |
| Mean DBP (mm of Hg) | 99.88± 5.19 | 95.85 ± 6.85 | 0.36 |
| Headache | 17(85%) | 38(95%) | 0.002 |
| Altered sensorium | 7(35%) | 12(30%) | |
| 3 or less fits | 12(60%) | 38(95%) | 0.005 |
| 4 or more fits | 8(40%) | 2(5%) | 0.005 |
| Unconscious | 18(90%) | 6(15%) | 0.001 |
| Impaired vision | 9(45%) | 17(42.5%) | 0.008 |
| **Laboratory parameter** | | | |
| AST (9-30 U/ L) | 33 ± 15 | 32 ± 13 | 0.77 |
| ALT (7-52 U/ L) | 40 ± 21 | 41 ± 29 | 0.87 |
| Uric acid (0.11-0.38 mmol/ L) | 0.42 ± 0.09 | 0.25 ± 0.11 | 0.004 (s) |
| Platelets (150-450 $\times 10^9$/ L) | 199 ± 101 | 233 ± 107 | 0.62 |
| WBC count (4-10 $\times 10^9$/ L) | 12.8 ± 6.1 | 9.8 ± 3.1 | 0.15 |

In the case group, 35 percent of patients had <3 GCS, 35 percent had 3-10 GCS, and 30 percent had 10-15 GCS. In the study group, GCS 3 was considerably higher. (The p-value is 0.001). In this study, fundoscopy was normal in 85 percent and 90 percent of categories A and B, respectively. Grade II, III, and IV were each 5 percent in category A and 5 percent, 5 percent, and 0 percent in category B. Fundoscopic changes were statistically insignificant in both Category A and Category B (p value- 0.53). Complications such as status epilepticus, pulmonary oedema, and ARF were observed in 5% of instances, whereas PPH, abruption, DIC, and aspiration pneumonia were observed in 2.5 percent of cases. There were three examples of each HELLP and neurologic impairment discovered. On MRI, the most prevalent diagnosis was CVT without 'infarct (20%), followed by infarct (6.67%), PRES (5%), and HLE (1.67%). (Table 3). A total of 20 individuals reported neurological Problems of eclampsia, with 18 having positive MRI results and two having negative MRI detection. There were 40 individuals with no neurologic manifestation, 2 with positive MRI detection and 38 with negative MRI detection.

**Table 3: MRI findings**

| MRI findings | **Category A** | **Category B** |
|---|---|---|

| | | |
|---|---|---|
| No abnormality detected | | 40 |
| Hypertensive leucoencephalopathy | 1 | - |
| Infarct | 4 | - |
| Posterior reversible encephalopathy syndrome | 3 | - |
| CVT without infarct | 12 | - |

**Table 4. Sensitivity and specificity**

| | Percentage |
|---|---|
| Sensitivity | 92.11 |
| Specificity | 75.55 |
| PPV | 53.87 |
| NPV | 97.16 |

The sensitivity, specificity, PPV, and NPV of neurological symptoms for abnormal MRI in eclampsia patients were shown to be 92.11 percent, 75.55 percent, 53.87 percent, and 97.16 percent, respectively.

**Discussion**

One of the main causes of PRES is eclampsia. In PRES, MR imaging of the brain is characterised by areas of altered signal intensity, most notably in the occipital and parietal regions. On T1WI, the lesions are typically isointense to hypointense, but hyperintense on T2WI and FLAIR sequences. White matter is more involved than grey matter, which is consistent with vasogenic edoema. The majority of lesions are hemispheric and bilaterally symmetric. [15] Various clinical and laboratory parameters in eclampsia patients with and without positive brain MR imaging findings were evaluated in this research. 58.33% of the women were between the ages of 20 and 25, while 35% were under the age of 20. A research by Jindal MA revealed 30 patients aged 20 to 25 years (60 percent), which was equivalent to the current study.[16]

In this study, the average age was 23.02±3.25 years. In a comparable research, Kokila MS et al found that the average mother age was 23.89 years. [17] Postpartum eclampsia affected 61.67 percent of women, whereas antepartum eclampsia affected 38.33 percent. These findings were also consistent with Majiko et al's epidemiological and interventional research in underdeveloped nations such as Zimbabwe.[18] (In a group of eight instances, the start of seizures was more antepartum than postpartum.[19] Fits, headache, impaired vision, unconsciousness, and altered sensorium were considerably greater in the study group, although mean blood pressure did not vary significantly between the two groups. More than half of the patients had more than one clinical manifestation. A research in Bangladesh found a statistically remarkable difference

between the two groups in terms of headache, visual problems, hypereflexia, and depression of consciousness, which was consistent with our findings, although aphasia and hemiplegia did not contribute substantially. [20] A Taiwanese investigation found comparable radiological results in eclampsia patients with headache and blurred vision. [21]

The mean uric acid levels in the Category A were 0.42±0.09 mmol/ L, whereas in the Category B they were 0.25±0.11 mmol/ L, which was determined to be statistically remarkable (p value 0.004). Mean blood creatinine amount were determined to be 81 21 mol/ L in the Category A and 70 11 mol/ L in the Category B (p value 0.03). Schwartz et al[22] revealed that MR-detected brain lesions are related with endothelial damage markers rather than hypertension. Similar to our study, they discovered that aberrant red cell morphology and LDH levels were considerably greater in eclampsia patients with abnormal MRI results, whereas BP were not statistically different across groups at any time. Similarly, in a Turkish research, biochemical parameters such as lactate dehydrogenase (LDH), uric acid, and creatinine levels were considerably higher in individuals with positive MR results compared to those who did not have positive MR findings. [23] Endothelial damage in preeclampsia/eclampsia has not been shown, however circulating endothelial toxins or endothelium antibodies are assumed to be to blame. [22]

Previous research has shown that in preeclampsia/eclampsia patients, elevated LDH levels exist before lesions emerge on brain MRI, indicating that high BP does not cause endothelial harm.[22,24] Renal function impairment caused by renal endothelium damage causes an increase in uric acid and creatinine. [23] There was no statistically remarkable difference in BP readings between patients with brain lesion or normal patients. However, in situations of preeclampsia/eclampsia, brain lesions may occur even if BP measurements are normal but still greater than a patient's normal blood pressure. [22] The location of brain lesions should also be considered when deciding whether hypertension or endothelial damage is more to blame for the aetiology.[23,24]

Complications such as status epilepticus, pulmonary oedema, and ARF were observed in 5% of instances, whereas PPH, abruption, DIC, and aspiration pneumonia were observed in 2.5 percent of cases. There were three examples of each HELLP and neurologic impairment discovered. There was no maternal mortality among the 60 patients. In a research done in an ICU in Cocody, complications such as HELLP syndrome, renal failure, and acute pulmonary edoema were found in 33.33 percent (n = 13), 18 percent (n = 7), and 5 percent (n = 2) of patients, respectively, with a fatality rate of 10.2 percent (n = 4).[25] On MRI, the most prevalent diagnosis was CVT without 'infarct (20%), followed by infarct (6.67%), PRES (5%), and HLE (5%). (1.67 percent ). According to a research by Kokila MS, 46.4 percent (n = 13) of women had additional non-eclamptic organic reasons for postpartum seizures, and CVT was responsible for 28.6 percent (n = 8) of postpartum seizures. [17] All (n = 19) eclamptic women with chronic neurological symptoms in a French research exhibited aberrant neuroradiological results on CT and MRI. This was done in 4 patients and revealed 3 patients of CVT and 2 patients of intracerebral haemorrhage.[26]

On CT imaging, brain lesions were found in 19 (48.7 percent) of the 54 patients admitted to the ICU at Cocody for eclampsia. These included ischemia (10 instances (25.6 percent), intraparenchymal bruising (3 cases (7.7 percent), subarachnoid haemorrhage (1 case (2.5 percent), and cerebral edoema (9 cases) (23 percent ). The CT scan revealed that 51 percent (n = 20) of the eclamptic individuals were normal. Another research in Bangladesh found that 85.72 percent of 35 individuals exhibited abnormalities in their brains on a CT scan. [20] 45.72 percent of them had cerebral oedema, 37.14 percent had cerebral infarction, and 2.86 percent had intracerebral haemorrhage. [20] The temporal link of the scan to the onset of seizure has a significant impact on the appearance of brain lesions in radiologic studies. [21] In fact, the MRI revealed some edematous brain lesions in eclamptic individuals who had a normal CT scan in the French investigation. [26] The sensitivity, specificity, PPV, and NPV of neurological symptoms for abnormal MRI in eclampsia patients were shown to be 92.11 percent, 75.55 percent, 53.87 percent, and 97.16 percent, respectively. Jindal MA performed a prospective observational research to evaluate CT and MRI results of eclampsia patients with regard to neurological signs and symptoms and discovered that MRI co-correlated more than CT with the neurological presentation and had 90 percent sensitivity and 100 percent sensitivity. [16]

**Conclusion :**

We concluded that clinical, laboratory and others parameters were not remarkable associated with positive MRI detection in women with eclampsia. In the follow-up of pregnant patients with pre-eclampsia/eclampsia, symptoms such as unconsciousness, altered sensorium, headache, blurred vision, seizures, GCS 3, elevated uric acid, and serum creatinine levels should serve as a warning for possible brain lesions, whereas booking status, mean blood pressure, fundoscopy findings, platelet count, haemoglobin, and liver enzymes were not significantly associated with positive magnetic resonance imaging findings in patients with eclampsia.

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